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TECHNICAL REPORT

NATICK/TR-78/026

MEAL, COMBAT, INDIVIDUAL, TWO-YEAR STORAGE STUDY

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JUNE 1978

UNITED STATES ARMY
NATICK RESEARCH and DEVELOPMENT COMMAND
NATICK, MASSACHUSETTS 01760

Food Engineering Laboratory
FEL-77

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This study, funded under Project Number 73146524000 and DOD Requirement JSR AM7-2, was initiative to determine the storage stability of Meal, Combat, Individual entrees and to determine the workability of the specification requirements through sensory examination, laboratory end item tests, and chemical analyses.

Samples of nine commercially produced entrees from the 1974 Meal, Combat,

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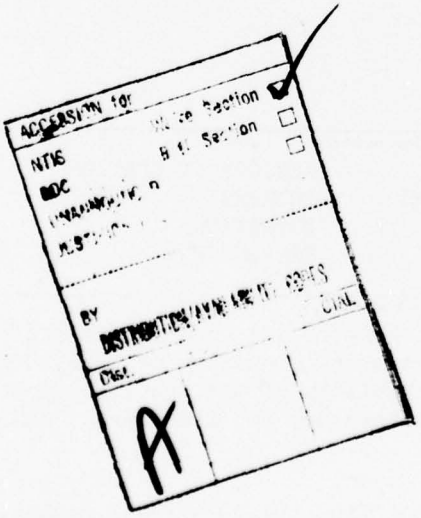
20. Abstract Continued --

Individual procurement were subjected to physical examinations and sensory quality evaluations over a two-year storage period at 4°C, 21°C, and 38°C. Results of the tests indicate the major physical changes due to time and temperature of storage were: a loss in vacuum and a swelling of cans containing acid tomato sauces, a darkening of product color, some breakage of meat pieces, and some absorption of the sauce into other product components. Sensory evaluations showed that most products showed few changes during the two-year storage period when held at temperatures of 4°C and 21°C. When stored at 38°C, significant decreases in sensory quality occurred in many products between 12 and 24 months.

With very few exceptions the specification requirements proved workable as evidenced by the physical, chemical, and sensory data.



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PREFACE

This study, funded under Project Number 73146524000 and DOD requirement JSR AM7-2 was initiative to determine the storage stability of Meal, Combat, Individual entrees and to determine the workability of the specification requirements through sensory examinations, laboratory end item tests, and chemical analyses.

The authors gratefully acknowledge the interest and support of Ms. Patricia A. Prell and Mrs. Margaret T. Branagan, and their associates in the Experimental Kitchens Branch of the Food Engineering Laboratory for providing the sensory data reported herein. The physical tests were performed by various personnel in the Animal Products Branch of the Food Engineering Laboratory. Chemical analyses were conducted by the staff of the Analytical Branch of the Food Sciences Laboratory.

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MEAL, COMBAT, INDIVIDUAL,
TWO-YEAR STORAGE STUDY

Introduction

Samples of nine commercially produced entrees from the 1974 procurement were subjected to physical examinations and sensory quality evaluations over a two-year storage period at 4.4°C, 21.2°C, and 37.8°C. The data are presented to (1) show the effects of time and temperature on physical and sensory quality attributed, and (2) evaluate the meaningfulness of current specification requirements and quality assurance procedures.

The products examined represent formulations that have been improved since 1970 to correspond more closely to similar items commercially produced for civilian markets. Of twelve entrees in the MCI ration, the following nine products from the 1974 procurement were examined for physical and sensory characteristics:

	ENTREE (Military Specification)	MANUFACTURER	CAN SIZE
1.	Beans with Frankfurter Chunks in Tomato Sauce, Canned (MIL-B-001065E)	Hanover Brands, Inc. Hanover, PA	11 3/4 oz (333g)
2.	Beans with Meatballs in Tomato Sauce, Canned (MIL-B-003915C)	Granite State Packing Corp., Manchester, NH	12 oz (340g)
3.	Beef Slices and Potatoes, with Gravy, Canned (MIL-B-3877C)	Tony Downs Foods Co., St. James, MI	11 1/2 oz (326g)
4.	Beefsteak with Gravy, Canned (MIL-B-001072F)	Oscar Mayer & Co., Madison, WI	5 1/2 oz (156g)
5.	Beef with Spiced Sauce, Canned (MIL-B-3872D)	Tony Downs Foods Co., St. James, MI	5 1/2 oz (156g)
6.	Ham and Eggs, Canned, Chopped (MIL-H-1038E)	Rocking K Foods, Inc., Santa Fe Springs, CA	5 1/2 oz (156g)
7.	Ham, Canned, Sliced, Cooked with Juices (MIL-H-1071D)	Oscar Mayer & Co., Madison, WI	5 1/2 oz (156g)
8.	Pork, Canned, Sliced, Cooked with Juices (MIL-P-1069D)	Oscar Mayer & Co., Madison, WI	5 1/2 oz (156g)
9.	Spaghetti with Beef Chunks in Sauce, Canned (MIL-S-00107F)	Blue Star Foods, Inc. Council Bluffs, IA	12 oz (340g)

Figure 1

TESTER (1-18)

PRODUCT (20-45)

INSTRUCTIONS: Please indicate number for quality scores in the box and make comments in the remaining space. Disregard the small numbers on this form; they are for data processing.

REJECT				BORDERLINE	ACCEPT			
Extremely Poor	Very Poor	Poor	Below Fair Above Poor	Fair	Below Good Above Fair	Good	Very Good	Excellent
1	2	3	4	5	6	7	8	9

SAMPLE (47-49)	APPEARANCE (55)	ODOR (61)	FLAVOR (67)	TEXTURE (73)	OVERALL QUALITY (79)

STSNL Form 964
1 Jul 74

FOOD QUALITY EVALUATION

EDITION OF 1 MAY 74 WILL BE USED UNTIL EXHAUSTED.

Test Procedures

Physical Examinations

The nine entrees were subjected to physical examinations reflecting the requirements of the specification at the time of purchase of samples (1974). These examinations were undertaken upon receipt of the samples, after 12 months and after 24 months of storage at 4°C, 21°C, and 38°C. With few exceptions, physical examinations were made on three cans of each product initially, three cans of each product at each temperature after 12 months storage, and six cans at each temperature after 24 months storage. Results of the physical examinations which appear at the end of the report (Tables 1a and 1b through 9a and 9b) give the actual weights and values of the cans examined as well as the specification requirements for each product. However, one should keep in mind that the requirements are moderated by acceptable quality limits (AQL's) established for each specification.

Chemical and Nutritional Analyses

Chemical and nutritional analyses were conducted on three cans of each product upon receipt of the samples.

Sensory Evaluations

Sensory evaluations were conducted by the Experimental Kitchens Branch of the Food Engineering Laboratory using a panel of 15 to 20 food technologists. All samples were examined at room temperature and evaluated for the attributes of appearance, odor, flavor, texture, and over-all quality using STSNL Form 964 (Figure 1). Ratings were given using a scale from 1 to 9 in which 1 equals extremely poor and 9 equals excellent.

For each type of product, the sensory panel data was analyzed separately for each parameter (appearance, odor, flavor, texture, overall quality) using the analysis of variance to analyze for the main effects of storage time (0, 6, 12, 18, 24 months) and temperature (4°C, 21°C, 38°C). Where the F test was significant, the Newman-Kuels' Multiple Range test was run to find where the difference occurred. All significant differences in this study are reported at the 5% level of significance.

Testing and Evaluation

Beans with Frankfurter Chunks in Tomato Sauce, Canned (Hanover Foods, Inc.)

Physical Examinations

The initial and 12-month examinations of cans of beans with frankfurter chunks in tomato sauce, canned, stored at 4°C, 21°C, and 38°C showed all samples to be in conformance with the requirements of Specification MIL-B-001065E. After two years of storage, decreases in vacuum were found. Three of five cans stored at 21°C were under the 5" (17KPa) Hg. vacuum, specified as a minimum for initial examinations. All of the six cans held at 38°C for two years had a positive pressure, and in four out of the six cans, swelling was noticeable. The color of the franks changed from pink or dark pink in the initial and one-year examinations to pinkish-brown after two years at 4°C and 21°C and reddish-brown with a yellow tinge after two years at 38°C. The color of the beans was pale brown in all cans except those held for two years at 38°C. In these samples, the beans had lightened considerably and were described as "off-white". One can out of the 28 examined in the two-year period was underweight in frankfurter chunks on the top (1/4") sieve and one can had more than the three air pockets allowed in the MIL-B-001065E specification. Tables 1a and 1b summarize the data from the physical attributes that may be influenced by time and temperature of storage, and Table 1b summarizes the physical attributes not expected to be affected by time and temperature of storage.

Chemical and Nutritional Analyses

The chemical and nutritional analyses of three cans conducted upon receipt of the samples showed the product to be in conformance with Specification MIL-B-001065E. Data from the analyses are found in Table 1c.

Sensory Evaluations

Table 1d shows the results of the sensory evaluations of the beans and frankfurter chunks over the 24-month period when held at 4°C, 21°C, and 38°C.

The initial ratings ranged from 6.3 to 7.3 (considered good) for the quality attributes of appearance, odor, flavor, texture, and overall quality, with appearance receiving the highest rating (7.3). Initial comments indicated that the product had a light red colored sauce; an odor typical of canned beans and frankfurters; a mild tomato, bean, and frankfurter flavor; and a soft and slightly mushy frankfurter texture with tender beans. No significant differences were found at any temperature over the two-year storage period with one exception. The

appearance ratings of the 38°C stored samples indicated a significant change after 24 months. However, the appearance was still rated good (6.6). Comments were made about black spots on the frankfurter chunks, a slight yellowish tinge to the frankfurters and a very light bean color. Comments also indicated that the texture of the frankfurters became softer and the odor and flavor slightly metallic with increasing time and temperature of storage.

Beans with Meatballs in Tomato Sauce, Canned. (Granite State Packing Corp.)

Physical Examinations

A decrease in vacuum was found in the Beans with Meatballs in Tomato Sauce with increased storage time and temperature. Vacuum readings of all of cans stored at 38°C for one year and those stored at 21°C for two years were under the 5" (17KPa) Hg vacuum initially specified. The six cans stored at 38°C for two years had a positive pressure reading, and the cans were slightly swollen. The sauce became slightly grainy after one year at 38°C. The color of the meatballs changed gradually from red-brown initially to orange-brown at all temperatures after two years. The beans remained essentially the same color throughout the storage tests. Four out of 30 cans had underweight meatballs on the top sieve (0.53"). All other physical qualities were in conformance with the Specification MIL-B-003915C. Table 2a gives the data on the physical tests for those attributes which might be influenced by time and temperature of storage. Table 2b contains the data on attributes not expected to be influenced by storage.

Chemical and Nutritional Analyses

As shown in Table 2c, the three samples analyzed upon receipt were in conformance with the requirements of MIL-B-003915C.

Sensory Evaluations

Table 2d shows the results of the sensory evaluations of Beans and Meatballs stored at 4°C, 21°C, and 38°C over an 18-month period.

The results of the initial evaluations show that the product rated from 6.9 to 7.4 (good) for the attributes of appearance, odor, flavor, texture, and overall quality. Comments on the initial examination indicated that the product had a red tomato sauce color; an odor typical of canned beans and tomato sauce; a canned beans and tomato sauce flavor with slightly bland meatballs; and a texture typical of canned beans and sauce with somewhat dry, compact, and finely ground meatballs. No significant differences were found over the 18-month storage period in all samples stored at 4°C and 21°C. However, when stored at 38°C for 12 months, changes were detected in appearance, odor, flavor, and overall quality, and at 18 months at 38°C, differences in these attributes were significant at the 5% level. No significant difference in texture was found. Comments made after 18 months storage at 38°C indicated a darkening of the beans and sauce; a metallic and scorched odor; and a slightly metallic and bitter flavor. No evaluations were undertaken at the 24-months-storage period because of the swelling of some cans.

Beef Slices and Potatoes with Gravy, Canned (Tony Downs Foods Co.)

Physical Examinations

The vacuum in the cans of Beef Slices and Potatoes with Gravy was in conformance with the 5" (17KPa) Hg specification requirement except after two years at 38°C when two out of six cans had no vacuum. The amount of free gravy decreased below the 52 ml required in MIL-B-3877C after two years at 4°C and 21°C. Five out of six cans stored for two years at 4°C had green discoloration on the meat edges. Ten out of the 33 cans examined over the two-year period had beef slices smaller than required in MIL-B-3877C which does not allow beef pieces less than 1/2 inch in any dimension. After two years at 21°C and 38°C, three cans out of twelve had less than the specified 85 grams of potato on the top (US Standard #1) sieve. This was probably due to the potatoes being less firm after storage causing them to break apart more easily. Only one can of the thirty-three had any defective potatoes (eyes, skin). Three cans had hard pieces greater than the 1/4" in any dimension allowable. One can was below the net weight requirement.

Table 3a shows the physical attributes dependent on storage time and temperature, and Table 3b shows those attributes not expected to be related to storage time and temperature.

Chemical and Nutritional Analyses

The chemical and nutritional analyses (Table 3c) shows two samples to be close to the salt minimum (1.0 to 1.6%) and one can slightly below the minimum salt requirement.

Sensory Evaluations

Sensory evaluation results on the Beef Slices with Potatoes, Canned, are found in Table 3d.

Initial ratings for all attributes ranged from 6.1 to 6.6 (below good, above fair). Comments indicated that the appearance, odor, and flavor were typical of canned meat and potatoes with a mild red-brown gravy. The texture of the meat was described as soft and slightly mushy, and a few panelists felt it resembled ground meat more than a solid muscle. The potato texture was firm. No significant differences were found in any samples stored at 4°C or 21°C over the 24-month-storage period or in the appearance, texture, and overall quality of those samples stored at 38°C. However, when stored at 38°C, the samples did show significant changes in odor and flavor. The odor ratings for the 38°C samples fluctuated somewhat, with ratings becoming significantly lower after 12 months. A significant decrease in the flavor ratings was noted in samples stored at 38°C after 24 months. Metallic odors and flavors were the apparent reasons for decreasing values.

Beefsteak with Gravy, Canned (Oscar Mayer & Co.)

Physical Examinations

The vacuum in the cans of beefsteak with gravy did not decrease to the extent of several other products. The lowest vacuum was 4" Hg (14KPa) in two cans stored for two years at 38°C. Five out of the 30 cans examined over the two years were underweight in the amount of beef on both sieves. No physical changes attributable to storage time and temperature were noted. Results of the physical examinations can be found in Tables 4a and 4b.

Chemical and Nutritional Analyses

The chemical and nutritional analyses (Table 4c) showed all samples in conformance with the Specification NIL-B-001072F.

Sensory Evaluations

Table 4d contains the results of the sensory evaluations of the beefsteak with gravy. Initial ratings ranged from 5.9 to 6.4 (below good, above fair) for each attribute. Comments on the initial examinations described the appearance as compact beef slices with little gravy; the odor as mild; the flavor as bland, canned beef with a low salt and spice flavor; and the texture as slightly dry. Over the 24-month period the only significant differences were in the odor of samples stored at 21°C and 38°C. Metallic odors apparently were the cause of these lower ratings. Although significant differences were not found in the ratings, the samples stored at 38°C for two years showed decreasing values in flavor and overall quality also apparently due to metallic flavors.

Beef with Spiced Sauce, Canned (Tony Downs Food Co.)

Physical Examinations

The vacuum in the cans of Beef with Spiced Sauce declined with storage, time, and temperature. All retained a slight vacuum except for the six cans stored at 38°C for two years. These cans showed a positive pressure. The presence of sauce was noticeable, initially, and after one and two years of storage at 38°C. However, the cans stored at 4°C and 21°C had no loose sauce after one and two years of storage. One can of the thirty examined was under the 85 grams of meat required on the top ($\frac{1}{4}$") sieve and three were under the 106 grams required for total meat weight. Two cans had meat pieces larger than the specified maximum size of 3/4" x 3/4" x 1/2". The MIL-B-3872D specification also requires that there be no meat pieces smaller than 1/4" x 1/4"x3/8". The initial examination showed each can had approximately five grams of undersized meat pieces. At one year, the number of undersized meat pieces was not recorded, probably due to the difficulty of counting numerous meat fines. After two years of storage, the cans contained approximately 28% (at 4°C storage) to 50-75% (at 38°C storage) of the total meat in very small pieces. The requirement for the size of meat pieces has been changed in the current (MIL-B-3872E) specification and requires that there be fifteen pieces of meat between 1/4" x 1/4" x 3/8" and 3/4" x 3/4" x 1/2". This should eliminate the problem in meeting the requirements of meat size. Five out of twenty-nine cans exceeded maximum of 14 grams of fat, ligaments, connective tissue, etc., over 1/4 inch in any dimension. In one of thirty cans, two pieces of bone were found, one approximately 3/4" x 1/2" x 1/8", the other approximately 1/8" x 1/4" x 1/8". The data from the physical examinations can be found in Tables 5a and 5b.

Chemical and Nutritional Analyses

The three cans analyzed upon receipt conformed with specification requirements. These analyses can be found in Table 5c.

Sensory Evaluations

Table 5d shows the results of sensory evaluations of the beef with spiced sauce. Initial mean ratings were 5.4 in appearance, 5.6 in flavor, and overall quality, 6.0 in texture, and 6.2 in odor, reflecting a fair appearance, flavor, and overall quality, and a good rating for texture and odor. Initial comments indicated a fatty meat appearance with visible gristle and very little sauce. The odor was described as typical of canned meat and the flavor as bland with little or no sauce flavor.

Comments indicated that the texture of the meat was more like ground beef than beef chunks. No significant differences at the 5% level were found in any attribute over the storage period, although the texture after 6 months, at all temperatures, was described as mushy; after 12 months as granular; and thereafter, as either mushy, grainy, or stringy. Decreasing values in flavor, texture, and over-all quality in the samples stored at 38°C reflected metallic and bitter tastes and a soft or grainy meat texture.

Ham and Eggs, Canned, Chopped (Rocking K Foods Inc.)

Physical Examinations

The only change in the canned Ham and Eggs, Chopped, directly attributable to time and temperature of storage was a darkening of the product from a light yellowish-brown color initially to a brownish-yellow color after two years at 21°C and an orangey-brownish-yellow color after two years at 38°C. Two cans had vacuum readings below 5" (17KPa) Hg, but all had a positive vacuum. No other nonconformances with the specifications were found. Results of the physical examinations are shown in Tables 6a and 6b.

Chemical and Nutritional Analyses

The chemical and nutritional analyses of three cans showed these to be in conformance with specification requirements. Results can be found in Table 6c.

Sensory Evaluations

The initial evaluations of chopped ham and eggs, canned, gave mean ratings from 5.4 to 6.3. The appearance, rated at 5.4 (fair), was described as grayish; the odor, rated 6.0 (below good, above fair) was slightly metallic; the flavor (6.1) was salty and low in ham flavor; and the texture (6.3) was smooth. No significant differences were found in the samples stored at 4°C and 21°C over the two-year period. When stored at 38°C, the flavor and overall quality was rated significantly lower after 18 and 24 months; the appearance and odor significantly lower after 24 months. Strong metallic and bitter tastes, a considerable darkening of color, and metallic odors were responsible for the lower ratings. The flavor and overall quality ratings after 24 months in those samples atored at 38°C were 3.8 (above poor), the lowest of any samples examined in this study. Comments indicated that all of the samples darkened in color and developed metallic odors and flavors with time and temperature of storage. While the samples stored at 4°C and 21°C became slightly drier with storage time, those at 38°C became watery and mushy after 18 and 24 months of storage.

Ham, Canned, Sliced, Cooked with Juices (Oscar Mayer and Co.)

Physical Examinations

As in most of the other products, the vacuum in these samples decreased with storage. However, all cans examined had a positive vacuum reading under all temperatures and times of storage. One out of thirty had an underweight meat weight and drained weight. The results of the physical examinations of Canned Ham Slices can be found in Tables 7a and 7b.

Chemical and Nutritional Analyses

As shown in Table 7c, the samples of Canned Ham Slices were in conformance with the specification requirements.

Sensory Evaluations

The results of the sensory evaluations of Ham Slices can be found in Table 7d. Initial ratings for appearance, odor, flavor, and overall quality ranged from 6.1 to 6.4 (below good, above fair). Texture at 5.7 (fair) was rated slightly lower. Initial descriptive comments indicated that there was a considerable number of fat pockets in the meat; a canned meat odor, a salty, canned ham flavor, and a soft, slightly mushy texture. As shown in Table 7d, no significant differences were found over the two-year storage period at any temperature. However, comments indicated a metallic taste and softer texture developing upon storage, particularly at the higher temperatures, resulting in a decrease in ratings.

Pork, Canned, Sliced, Cooked with Juices (Oscar Mayer & Co.)

Physical Examinations

The vacuum in the cans of Sliced Pork decreased with time and temperature of storage but all retained a positive vacuum. Although all of the samples examined were in conformance with the meat remaining on the top sieve (US Standard 0.53"), two of the thirty cans were under the required 128 grams total meat weight. All were in conformance with the 1/4" to 3/4" slice thickness required in the MIL-P-1069D specification. A grayish color developed upon storage. Table 8a and Table 8b contain the results of the physical examination of this product.

Chemical and Nutritional Analyses

As shown in Table 8c, the chemical and nutritional analyses were in conformance with specification requirements.

Sensory Evaluations

Results of the sensory evaluations of Pork Slices (Table 8d) show initial ratings between 5.8 to 6.1 (below good, above fair) for all attributes. The initial comments described the appearance as similar to a fabricated meat portion with a pinkish tan color, the odor typical of canned meat, the flavor as very salty and somewhat lacking in pork identity, and the texture as soft and slightly mushy and more like luncheon meat than pork slices. No significant differences were found in any attribute over the storage time at the three storage temperatures. However, comments indicated that the saltiness in flavor and the softness or mushiness in texture appeared to be accentuated with time and temperature of storage.

Spaghetti with Beef Chunks in Sauce, Canned (Blue Star Foods Inc.)

Physical Examinations

The can vacuum in the samples of Spaghetti with Beef Chunks decreased with storage time and temperature and those stored at 38°C for two years had a positive pressure. The MIL-S-00107F specification requires that the contents of the can should slide out when the can is shaken lightly. However, all of the samples were rather solid in consistency and had to be spooned from the can. Eleven of 33 cans were underweight in meat on the top sieve and eight out of 28 were underweight in spaghetti. The cutting test procedure specifies weighing on the top sieve (0.53") only. However, a considerable amount of meat and spaghetti pass through this sieve. On five cans, the spaghetti on both sieves was weighed and the mean weight was over twice the amount on the top sieve alone. Therefore, the data on the amount of meat and spaghetti when recorded on the top sieve only is meaningless. The spaghetti texture was described as matted, mushy and/or pasty in all samples. Two cans of the total 33 had fat chunks, connective tissue, ligaments, etc., greater than the allowable 14 grams. The results of the physical examination of Spaghetti and Beef Chunks are shown in Tables 9a and 9b.

Chemical and Nutritional Analyses

As shown in Table 9c, two of the three cans analyzed were over the 8% maximum fat requirement.

Sensory Evaluations

The results of the sensory evaluations of Spaghetti and Beef Chunks are shown in Table 9d. The initial ratings ranged from 6.3 to 6.8 (below good, above fair). The appearance was described as bright in color, and very thick in consistency, the odor as slightly metallic, the flavor as bland and slightly scorched, the texture of the spaghetti as mushy and the meat as fibrous. No significant differences in appearance, odor and flavor were found over the 24-month-storage period at 4°C and 21°C. The appearance of the samples stored at 38°C began to change after 12 months, and after 18 and 24 months of storage was significantly different, mostly due to a darkening of color. The odor and flavor of samples stored at 38°C became significantly different after 12 months storage period. An increase in metallic and scorched odors and flavors as well as a bitter taste were noticed in these samples. The texture of all samples deteriorated rapidly upon storage causing significant changes as early as six months. An increasing mushiness of the spaghetti and tough dry meat were noted. With the longer storage

and higher temperatures, an increasing watery impression developed; while, with longer storage at lower temperatures, the product was thicker and dryer.

Summary and Conclusions

The data from the 1974 MCI storage tests indicate that the major physical changes under the storage conditions of this study were: A loss in vacuum and a swelling of cans containing an acid tomato sauce, a darkening of product color, some breakage of meat pieces and some absorption of the sauce into the other product components. The physical examinations of spaghetti and beef chunks in sauce, canned, showed the procedure was not satisfactory in assessing the amount of spaghetti and meat in the can. This procedure is being changed so that now the amount of spaghetti and meat on both sieves is weighed.

The chemical and nutritional analyses undertaken on three cans of each product showed that of the 60 total analyses mandated by the specification requirements, only six were in nonconformance. These were ham and eggs, chopped (three cans had high fat content); spaghetti and beef chunks in sauce, canned (two cans had high fat content), and beef slices and potatoes with gravy, canned (one can had a high salt content). Sensory evaluations showed that most products held up well under storage temperatures of 4°C and 21°C. When held at 38°C, significant decreases in sensory qualities occurred between 12 and 24 months.

It could be concluded that the MCI entrees examined in this study may be stored at 4°C and 21°C for 24 months without serious deterioration in quality. However, when stored at a higher temperature (38°C), the storage period should probably be a maximum of 12 months.

This document reports research undertaken at the US Army Natick Research and Development Command and has been assigned No. Natick/TR-78/026 in the series of reports approved for publication.

Table 1a
Beans with Frankfurter Chunks, Canned, in Tomato Sauce
MIL-B-001065E
1974 MCI Procurement (11-3/4 oz can) Hanover Foods Inc. (Code: #4-103)
Summary of Physical Examinations for Attributes that may be Influenced by Time and Temperature of Storage

	Can Vacuum (in Hg)	(KPa)	Can Condition	Condition of Sauce	Weight of Franks on top sieve (0.53")(g)	Weight of Beans on both sieves (0.53" + No. 8)	Wt. of Sauce (by difference)(g)	Wt. of Franks with green or yellow discoloration (g)	Weight of beans off color, broken mashed, etc. (g)	Bean Texture
Specification Requirement MIL-B-001065E	* ≮ 5.0	≮17		not lumpy or grainy	≮ 64	99-156	---	** ≯ 4	≯ 21	Not hard, tough coarse, or mushy
Initial (3 cans)										
Mean	5.0	17	Good	Good	79.0	117.0	143.0	1.0	2.0	Good
Standard Deviation	0.6		----	----	4.0	7.5	4.6	0	1.2	----
Nonconformances	0		----	----	0	0	---		0	----
1 year at 4°C (3 cans)										
Mean	10.0	34	Good	Good	80.0	142.0	109.0	2.0	3.0	Good
Standard Deviation	0.3		----	----	1.5	2.6	6.3	1.7	1.2	----
Nonconformances	0		----	----	0	0	---	0	0	----
1 year at 21°C (3 cans)										
Mean	9.0	30	Good	Good	86.0	146.0	108.0	2.0	2.0	Good
Standard Deviation	0.8		----	----	6.4	1.0	7.8	1.5	3.5	----
Nonconformances	0		----	----	0	0	---	0	0	----
1 year at 38°C (3 cans)										
Mean	7.0	24	Good	Good	72.0	141.0	124.0	1.0	3.0	Good
Standard Deviation	1.2		----	----	5.8	3.2	10.8	1.0	3.1	----
Nonconformances	0		----	----	0	0	---	0	0	----
2 years at 4°C (5 cans)										
Mean	7.0	24	1 sl. dented	Good	76.0	128.0	132.0	2.0	7.0	Good
Standard Deviation	1.1		----	----	5.4	4.0	4.0	2.6	1.1	----
Nonconformances	0		----	----	0	0	---	0	0	----
2 years at 21°C (5 cans)										
Mean	7.0	24	Good	Good	74.0	127.0	137.0	1.0	6.0	Good
Standard Deviation	1.8		----	----	6.1	3.6	8.6	1.2	2.8	----
Nonconformances	3 out of 5		----	----	0	0	---	0	0	----
2 years at 38°C (6 cans)										
Mean	0	0	4 out of 6	Good	72.0	122.0	144.0	ALL	13.0	Good
Standard Deviation	0		swollen, 1 sl.	----	5.9	5.1	5.0	0	29.0	----
Nonconformances	6 out of 6		dented, severe erosion on all	----	1 out of 6	0	---	6 out of 6	0	----

* ≮ Not less than
** ≯ Not greater than

Table 1a (Continued)

	Frank Texture	Frank Color	Bean Color	% Franks	% Beans	% Sauce (by difference)
Specification requirements MIL-B-001065E	not hard, tough, coarse or mushy	not foreign	not foreign	--	--	--
Initial (3 cans)						
Mean	Good	dark pink	pale brown	23	35	42
Standard Deviation	--	---	---	--	--	--
Nonconformances	--	---	---	--	--	--
1 year at 4°C (3 cans)						
Mean	Good	pink	pale brown	24	42	34
Standard Deviation	--	---	---	--	--	--
Nonconformances	--	---	---	--	--	--
1 year at 21°C (3 cans)						
Mean	Good	pink	pale brown	25	43	32
Standard Deviation	--	---	---	--	--	--
Nonconformances	--	---	---	--	--	--
1 year at 38°C (3 cans)						
Mean	Good	pink	pale brown	21	42	37
Standard Deviation	--	---	---	--	--	--
Nonconformances	--	---	---	--	--	--
2 years at 4°C (5 cans)						
Mean	Good	pinkish brown	pale brown	23	38	39
Standard Deviation	--	---	---	--	--	--
Nonconformances	--	---	---	--	--	--
2 years at 21°C (5 cans)						
Mean	Good	pinkish brown	pale brown	22	38	40
Standard Deviation	--	---	---	--	--	--
Nonconformances	--	---	---	--	--	--
2 years at 38°C (6 cans)						
Mean	Good	reddish brown with yellowish tinge	off-white	21	36	43
Standard Deviation	--	---	---	--	--	--
Nonconformances	--	---	---	--	--	--

Table 1b
Beans with Frankfurter Chunks, Canned, in Tomato Sauce
MIL-B-001065E

1974 MCI Procurement — Hanover Foods, Inc.
11 3/4-oz cans — Code: #4-103

Summary of Physical Examinations of 28 Cans over a 2-Year Storage Period at 4°, 21°, and 38°C
Attributes* not expected to be influenced by Time and Temperature of Storage

	Range	Mean	Standard Deviation	Specification Requirement MIL-B-001065E	Nonconformances	Other
Net weight (g)	322-341	337.0	4.4	** ≮ 319	0	---
Foreign Material	0	0	0	none	0	---
No. of fat, air, gelatin pockets > 1/8"	0-6	0.7	1.4	*** ≯ 3 per can	1 out of 28	---
Type of Pockets	---	---	---	---	--	Air
No. of pieces of cartilage, tendons, and connecting tissue > 1/4"	0	0	0	0	0	---
No. of pieces of bone > 1/4"	0	0	0	0	0	---
No. of frankfurters split or ruptured > 1/4"	0	0		0	0	---
No. of frankfurters retaining all or part of artificial casing	0	0	0	0	0	---
No. of frankfurter chunks on top $\frac{1}{2}$" sieve	8-11	9.0	0.7	7-11	0	---

*All attributes are expressed in numbers per can
** ≮ not less than
*** ≯ not more than

Table 1c
Beans with Frankfurter Chunks, Canned in Tomato Sauce
MIL-B-001065E

1974 MCI Procurement — Hanover Foods, Inc.
11 3/4-oz cans — Code: #4-103
Chemical and Nutritional Analyses

	Sample #1	Sample #2	Sample #3	Mean	Standard Deviation	Specification Requirement MIL-B-001065#	Nonconformances
Moisture (%)	73.02	72.15	73.59	72.92	0.7	66-76	0
Protein (%)	6.23	6.45	6.09	6.25	0.2	---	--
Fat (%)	7.74	8.67	7.74	8.05	0.5	---	--
Ash (%)	1.94	1.97	1.93	1.95	0.02	---	--
Salt (%)	1.20	1.27	1.25	1.24	0.04	0.8-1.6	0
Ca (mg/100 g)	45.4	41.7	40.8	42.6	2.4	---	--
P (mg/100 g)	92	91	87	90	2.6	---	--
Fe (mg/100 g)	1.2	0.9	0.8	1.0	0.2	---	--
Na (mg/100 g)	552	580	556	563	15.1	---	--
K (mg/100 g)	185	211	194	197	13.2	---	--
Mg (mg/100 g)	21.2	19.9	19.4	20.2	0.9	---	--

Table 1d
Beans with Frankfurter Chunks in Tomato Sauce, Canned
MIL-B-001065E
1974 Procurement Hanover Foods, Inc.

Mean Sensory Panel Ratings over a 24-month Storage Period at 4°C, 21°C, and 38°C for Attributes of Appearance, Odor, Flavor, Texture, and Overall Quality (1)

	N	Appearance			Odor			Flavor			Texture			Overall Quality		
		4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C
0 mo	19	7.3(2)	7.3	7.3[a]	6.6	6.6	6.6	6.3	6.3	6.3	6.4	6.4	6.4	6.4	6.4	6.4
6 mo	17	7.1	7.2	7.0[ab]	6.6	6.6	6.6	6.2	6.4	6.2	6.2	6.4	6.4	6.4	6.5	6.4
12 mo	17	7.0	7.1	7.0[ab]	6.7	6.8	6.8	6.2	6.5	6.6	6.1	6.3	6.1	6.1	6.4	6.3
18 mo	20	6.9	7.0	6.9[ab]	6.7	6.7	6.6	6.3	6.3	5.9	6.2	6.2	6.1	6.2	6.3	6.0
24 mo	24	6.9	6.8	6.6[b]	6.7	6.6	6.7	6.4	6.4	5.8	6.2	6.2	6.3	6.3	6.3	5.9
F test		NS	NS	SIG	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

(1) All samples were evaluated at room temperature and rated on a scale from 1 to 9 in which 1 = extremely poor, 9 = excellent

(2) Mean ratings without a letter indicates no significant difference. Changes in letters (for example, from a to b) indicates a significant difference at the 5% level

Table 2a
Beans With Meatballs in Tomato Sauce, Canned
MIL-B-003915C
1974 Procurement — Granite State Packing Corp.
12-oz cans — Code: #214
Summary of Physical Examinations that may be Influenced by Time and Temperature of Storage

	Can vacuum (in. Hg)	Can vacuum (KPa)	Can condition	Condition of sauce	Wt. of meatballs on top sieve (0.53") (g)	Wt. of beans on both sieves (0.53"+ No. 8) (g)	Sauce weight (by difference) (g)	Wt. of beans spotted, mashed, off-color, etc. (g)	Meatball Color	Bean Color	% Meatballs	% Beans	% Sauce
Specification requirement MIL-B-003915C	≮ 5.0*	≮ 17		not lumpy or grainy	≮ 85.0	≯ 128.0**	≮ 21.0	≯ 14.0	not foreign	not foreign	-	-	-
Initial (3 cans)													
Mean	6.0	20	Good	Good	85.0	115.0	144.0	0	red-brown	beige	25	33	42
Standard Deviation	0.6		----	----	1.5	3.0	5.2	0	---	-----	--	--	--
Nonconformances	0		----	----	1 out of 3	0	0	0	---	-----	--	--	--
1 year at 4°C (3 cans)													
Mean	6.0	20	Good	v.sl.grainy	89.0	116.0	142.0	3.0	red-brown	beige	26	34	40
Standard Deviation	0.6		----	----	0.6	3.2	6.8	0	---	-----	--	--	--
Nonconformances	0		----	0	0	0	0	0	---	-----	--	--	--
1 year at 21°C (3 cans)													
Mean	5.0	17	Good	1 out of 3 grainy	92.0	119.0	135.0	5.0	pinkish-brown	beige	27	34	39
Standard Deviation	0.6		----		4.6	1.2	6.1	1.5	---	-----	--	--	--
Nonconformances	0		----	1 out of 3	0	0	0	0	---	-----	--	--	--
1 year at 38°C (3 cans)													
Mean	3.0	10	Good	Sl.grainy	90.0	120.0	135.0	3.0	rusty-brown	beige	26	35	39
Standard Deviation	0.6		----		1.5	4.2	5.1	2.5	---	-----	--	--	--
Nonconformances	3 out of 3		----	3 out of 3	0	0	0	0	---	-----	--	--	--
1 year at 4°C (6 cases)													
Mean	6.0	20	Good	Good	93.0	121.0	132.0	4.0	orange-brown	beige	27	35	38
Standard Deviation	0.9		0	----	2.9	3.1	4.3	2.6	---	-----	--	--	--
Nonconformances	0		----	0	0	0	0	0	---	-----	--	--	--
1 year at 21°C (6 cases)													
Mean	3.0	10	5 out of 6 dented	Good	94.0	122.0	128.0	5.0	orange-brown	beige	27	36	37
Standard Deviation	0.8		----	0	1.5	3.1	3.5	2.8	---	-----	--	--	--
Nonconformances	6 out of 6		5 out of 6	0	0	0	0	0	---	-----	--	--	--

* ≮ = not less than
** ≯ = not more than

Table 2a (Continued)

	Can vacuum (in.Hg)	(KPa)	Can condition	Condition of sauce	Wt. of meatballs on top sieve (0.53") (g)	Wt. of beans on both sieves (0.53"+ No. 8) (g)	Sauce weight (by difference (g)	Wt. of beans spotted, mashed, off-color, etc. (g)	Meatball Color	Bean Color	% Meatballs	% Beans	% Sauce
1 year at 38°C (6 cases)													
Mean	< 0	<0	all swollen	grainy	84.0	121.0	138.0	3.0	orange-brown	dark beige	24	35	41
Standard Deviation	----		----	----	1.5	4.0	2.3	1.7	-----	------	--	--	--
Nonconformances	6 out of 6	<0	6 out of 6	6 out of 6	3 out of 6	0	0	0	-----	------	--	--	--

*4 = not less than
**$\frac{1}{2}$ = not more than

Table 2b
Beans with Meatballs in Tomato Sauce, Canned
MIL-B-003915C

1974 Procurement — Granite State Packing Corp.
12-oz cans — Code: #214

Summary of Physical Examination of 30 Cans Over a 2-Year Storage Period at 4°, 21°, and 38°C
Attributes* not expected to be influenced by Time and Temperature of storage

	Range	Mean	Standard Deviation	Specification Requirement MIL-B-003915C	Nonconformances
Net weight (g)	341-347	344	1.6	** ≮326	0
No. of meatballs on top sieve	7	7	0	≮ 7	0
No. of pieces of bone >1/4"	0	0	0	0	0
No. of hard pieces of cartilage, ligaments, tendons, or connecting tissue > 1/4"	0	0	0	0	0
No. of pieces of cartilage, tendons, or connecting tissue >1/2"	0	0	0	0	0
Wt. of beans that are spotted, off-color, broken, mashed, matted, or damaged (g)	0-10	4	2.5	*** ⊁14	0
Foreign material	0	0	0	0	0

*All attributes expressed in numbers or weight per can
** ≮ = not less than
*** ⊁ = not more than

Table 2c
Beans with Meatballs in Tomato Sauce, Canned
MIL-B-003915C

1974 Procurement
12 oz can

Granite State Packing Corp.
Code: #214

Chemical and Nutritional Analyses

	Sample #1	Sample #2	Sample #3	Mean	Standard Deviation	Specification Requirement MIL-B-003915C	Nonconformances
Moisture (%)	71.18	71.28	70.78	71.08	0.3	*≯ 72	0
Protein (%)	8.22	8.15	8.28	8.22	0.07	--	--
Fat (%)	8.36	7.97	8.73	8.35	0.4	≯ 9	0
Ash (%)	1.77	1.73	1.70	1.73	0.04	--	--
Salt (%)	0.85	0.87	0.88	0.87	0.02	0.8-1.6	0
Ca (mg/100 g)	57.2	58.0	56.8	57.3	0.6	--	--
P (mg/100 g)	88	85	84	85.7	2.1	--	--
Fe (mg/100 g)	1.6	1.0	1.0	1.2	0.3	--	--
Na (mg/100 g)	450	445	439	445	5.5	--	--
K (mg/100 g)	217	205	201	208	8.3	--	--
Mg (mg/100 g)	19.7	21.3	20.8	20.6	0.8	--	--

*≯ = not greater than

Table 2d
Beans with Meatballs, in Tomato Sauce, Canned
MIL-B-003915C
1974 Procurement Granite State Packing Corp.

Mean Sensory Panel Ratings over an 18-month Storage Period at 4°, 21°C, and 38°C for Attributes of Appearance, Odor, Flavor, Texture, and Overall Quality(1)

		Appearance			Odor			Flavor			Texture			Overall Quality		
	N	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C
0 mo	20	7.4(2)	7.4	7.4[a]	7.2	7.2	7.2[a]	7.1	7.1	7.1[a]	6.9	6.9	6.9	7.1	7.1	7.1[a]
6 mo	20	7.1	7.1	7.0[ab]	7.1	6.8	6.8[ab]	6.8	6.8	6.6[a]	6.8	6.7	6.7	6.8	6.8	6.7[a]
12 mo	19	6.8	6.7	6.9[ab]	6.8	6.5	6.6[ab]	6.6	6.6	6.2[a]	6.7	6.7	6.5	6.6	6.5	6.2[ab]
18 mo	22	6.9	7.0	6.6[b]	6.7	6.8	6.3[b]	6.4	6.5	5.6[b]	6.7	6.6	6.2	6.4	6.6	5.7[b]
F test		NS	NS	SIG	NS	NS	SIG	NS	NS	SIG	NS	NS	NS	NS	NS	SIG

(1) All samples were evaluated at room temperature and rated on a scale from 1 to 9 in which 1 = extremely poor, 9 = excellent.

(2) Mean ratings without a letter indicate no significant difference. Changes in letters (for example, from a to b) indicates a significant difference at the 5% level.

Table 3a
Beef Slices and Potatoes with Gravy, Canned
MIL-B-3877C

1974 Procurement — Tony Downs Foods Co.
11 1/2-oz cans — Code: 123UA

Summary of Physical Examinations for Attributes that may be Influenced by Time and Temperature of Storage

	Can Vacuum (in Hg)	Can Vacuum (KPa)	Can Condition	Free Gravy Volume (g)	Product Color	No. of slices of beef **≥1½ in.	Total weight of conforming beef slices (g)	Total wt. of beef on both sieves (g) (USS #1 & #8 sieve)	Wt. of beef <½" in any dimension (g)	No. of potato slices ≥1x1"	Wt. of potatoes on top sieve (g)(US#1)
Specification requirement MIL-B-3877C	*≤5.0	≤17		≤52.0	not foreign	≤3.0	≤71.0	≤106.0	0	≤3.0	≤85.0
Initial (6 cans)											
Mean	7.0	24	Good	87.0	Good	3.2	117.0	123.0	0	6.0	94.0
Standard Deviation	0.8	--	----	1.9	0	0.4	1.5	1.6	0	1.2	0
Nonconformances	0	--	----	0	0	0	0	0	0	0	0
1 year at 4°C (3 cans)											
Mean	8.0	27	Good	65.0	Good	3.0	129.0	134.0	0.7	5.7	104.0
Standard Deviation	2.0	--	----	9.9	0	0	2.1	3.5	1.2	1.2	5.9
Nonconformances	0	--	----	0	0	0	0	0	1 out of 3	0	0
1 year at 21°C (3 cans)											
Mean	9.0	30	Good	60.0	Good	3.0	127.0	133.0	2.0	6.0	105.0
Standard Deviation	1.2	--	----	7.8	0	0	4.9	2.0	4.0	1.0	2.5
Nonconformances	0	--	----	0	0	0	0	0	1 out of 3	0	0
1 year at 38°C (3 cans)											
Mean	7.0	24	Good	65.0	Good	3.0	120.0	124.0	3.0	8.0	105.0
Standard Deviation	2.1	--	----	4.2	0	0	6.2	7.8	3.0	0.6	3.8
Nonconformances	0	--	----	0	0	0	0	0	2 out of 3	0	0
2 years at 4°C (6 cans)											
Mean	10.0	34	Good	23.0	sl. green on	3.0	144.0	152.0	0	5.0	117.0
Standard Deviation	1.2	--	----	8.3	edges on	0	4.0	1.5	0	1.2	3.2
Nonconformances	0	--	----	6 out of 6	slices in 5 out of 6	0	0	0	0	0	0
2 years at 21°C (6 cans)											
Mean	9.0	30	1 sl. dented	34.0	Good	3.0	125.0	129.0	0	5.0	86.0
Standard Deviation	1.2	--	----	1.7	0	0	3.9	3.4	0	1.0	10.6
Nonconformances	0	--	----	6 out of 6	0	0	0	0	0	0	2 out of 6
2 years at 38°C (6 cans)											
Mean	1.3	3	sl. rust	63.0	Good	3.0	119.0	126.0	6.3	5.5	94.0
Standard Deviation	1.0	--	on seams	2.7	0	0	2.3	2.5	3.1	1.0	6.3
Nonconformances	6 out of 6	--	----	0	0	0	0	0	6 out of 6	0	1 out of 6

Table 3a (Continued)

	Weight of Gravy by difference (g)	% Beef	% Potatoes***	% Gravy by difference
Initial (6 cans)				
Mean	106.0	38	29	33
Standard Deviation	4.7	--	--	--
Nonconformances	---	--	--	--
1 year at 4°C (3 cans)				
Mean	88.0	41	32	27
Standard Deviation	9.7	--	--	--
Nonconformances	---	--	--	--
1 year at 21°C (3 cans)				
Mean	86.0	41	32	27
Standard Deviation	3.0	--	--	--
Nonconformances	---	--	--	--
1 year at 38°C (3 cans)				
Mean	99.0	38	32	30
Standard Deviation	6.5	--	--	--
Nonconformances	---	--	--	--
2 years at 4°C (6 cans)				
Mean	61.0	46	36	18
Standard Deviation	4.8	--	--	--
Nonconformances	---	--	--	--
2 years at 21°C (6 cans)				
Mean	111.0	37	25	38
Standard Deviation	8.6	--	--	--
Nonconformances	---	--	--	--
2 years at 38°C (6 cans)				
Mean	118.0	38	28	34
Standard Deviation	3.9	--	--	--
Nonconformances	---	--	--	--

* ≮ = not less than
** ≯ = not more than
*** Shows only those on the top (USS #1) sieve. A few may have dropped through this sieve

Table 3b
Beef Slices and Potatoes with Gravy, Canned
MIL-B-3877C
1974 Procurement — Tony Downs Foods Co.
11 1/2-oz cans — Code: #123UA
Summary of Physical Examinations on 33 Cans over a 2-Year Storage Period at 4°, 21°, and 38°C
Attributes* not expected to be influenced by time and temperature of storage

	Range	Mean	Standard Deviation	Specification Requirement MIL-B-3877C	Nonconformances
Net weight (g)	325-332	328.00	2.5	**≮326	1 can out of 33
No. of bone pieces ≯1/4"	0	0	0	0	0
No. of defective potatoes (eyes, blemishes ≯1/4" sunburst, hollow hearts)	0-3	0.09	0.5	0	1 can out of 33
Wt. of ligaments, tendons, conn. tissue, blood vessels, cart., gristle, or glandular material (g)	0-3	0.70	0.9	***≯14	0
No. of hard material ≯1/4"	0-3	0.60	0.7	0	3 cans out of 33
Foreign material	0	0	0	0	0
Thickness of beef at thickest and thinnest point (in.)	3/8 - 1/2	---	---	1/8 - 3/4	0
Thickness of potatoes at thickest and thinnest point (in.)	3/8 - 5/8	---	---	1/4 - 5/8	0

*All attributes expressed in number or weight per can
** ≮ = not less than
*** ≯ = not more than

Table 3c
Beef Slices and Potatoes with Gravy, Canned
MIL-B-3877C
1974 Procurement — Tony Downs Foods Co.
11 1/2-oz cans — Code: #123UA
Chemical and Nutritional Analyses

	Sample #1	Sample #2	Sample #3	Mean	Standard Deviation	Specification Requirement	Nonconformances
Moisture (%)	75.46	75.33	75.57	75.50	0.1	---	---
Protein (%)	11.20	10.94	10.88	11.00	0.2	---	---
Fat (%)	5.08	5.07	5.46	5.20	0.2	*8	0
Ash (%)	1.54	1.51	1.50	1.53	0.02	---	---
Salt (%)	1.01	0.98	1.00	1.00	0.02	1.0-1.6	1 out of 3
Ca (mg/100 g)	56.1	57.3	56.1	56.5	0.7	---	---
P (mg/100 g)	88	89	86	88	1.5	---	---
Fe (mg/100 g)	1.5	1.6	1.8	1.6	0.2	---	---
Na (mg/100 g)	404	385	393	394	9.5	---	---
K (mg/100 g)	260	284	283	276	13.6	---	---
Mg (mg/100 g)	24.5	24.3	23.6	24.1	0.5	---	---

* = not more than

Table 3d
Beef Slices and Potatoes, with Gravy, Canned
1974 Procurement Oscar Mayer & Co.

Mean Sensory Panel Ratings over a 24-month Storage Period at 4°C, 21°C, and 38°C for Attributes of Appearance, Odor, Flavor, Texture, and Overall Quality (1)

	N	Appearance			Odor			Flavor			Texture			Overall Quality		
		4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C
0 mo	20	6.6(2)	6.6	6.6	6.6	6.6	6.6[a]	6.2	6.2	6.2[a]	6.1	6.1	6.1	6.1	6.1	6.2
6 mo	20	6.5	6.6	6.4	6.3	6.3	6.4[ab]	6.2	6.2	6.1[a]	6.1	6.0	6.2	6.2	6.2	6.1
12 mo	21	6.4	6.6	6.6	6.2	6.3	6.0[b]	6.0	6.0	5.8[ab]	6.1	6.0	6.1	6.0	6.1	5.8
18 mo	18	6.4	6.6	6.5	6.3	6.3	6.2[ab]	5.8	6.0	5.7[ab]	6.1	6.1	6.0	5.9	6.2	5.8
24 mo	19	5.9	6.3	6.2	6.1	6.1	5.8[b]	5.9	5.9	5.2[b]	5.8	5.9	5.8	5.9	5.9	5.3
F test		NS	NS	NS	NS	NS	SIG	NS	NS	SIG	NS	NS	NS	NS	NS	NS

(1) All samples were evaluated at room temperature and rated on a scale from 1 to 9 in which 1 = extremely poor, 9 = excellent

(2) Mean ratings without a letter indicates no significant difference. Changes in letters (for example, from a to b) indicates a significant difference at the 5% level

Table 4a
Beefsteak with Gravy, Canned
M-B-001072F

1974 Procurement — Oscar Mayer & Co.
5⅓-oz cans — Code: 1A-13113

Summary of Physical Examination for Attributes that may be Influenced by Time and Temperature of Storage

	Can Vacuum (in Hg)	Can Vacuum (KPa)	Can Condition	Presence of Gravy	Weight of Beef or both sieves (0.53" and #8) (g)	Product Color	Wt. of Beef Slices Meeting Specification (g)	Weight of gravy by difference (g)	% Beef	% Gravy (by difference)
Specification Requirement MIL-B-10720F	* 5.0	17		Shall be present	* 128.0	Not foreign	113.0	---	--	--
Initial (3 cans)										
Mean	6.0	20	Good	Yes	127.0	Good	127.0	39.0	78	22
Standard Deviation	---		----	---	3.5	----	3.5	4.4	--	--
Nonconformances	---		----	---	1 out of 3	----	1 out of 3	---	--	--
1 year at 4°C (3 cans)										
Mean	13.0	44	Good	Yes	135.0	1 piece	135.0	26.0	84	16
Standard Deviation	2.8		----	---	3.0	dark spot	3.0	3.8	--	--
Nonconformances	---		----	---	0	1 out of 3	0	---	--	--
1 year at 21°C (3 cans)										
Mean	14.0	44	Good	Yes	132.0	Good	132.0	2.8	83	17
Standard Deviation	3.5		----	---	1.0	----	1.0	2.9	--	--
Nonconformances	---		----	---	0	----	0	---	--	--
2 years at 4°C (6 cans)										
Mean	6.0	20	Good	Yes	142.0	Good	142.0	22.0	87	13
Standard Deviation	2.7		----	---	2.0	----	2.0	1.7	--	--
Nonconformances	---		----	---	0	----	0	---	--	--
2 years at 21°C (6 cans)										
Mean	10.0	34	Good	Yes	137.0	Good	137.0	28.0	83	17
Standard Deviation	2.7		----	---	2.0	----	2.0	2.4	--	--
Nonconformances	---		----	---	0	----	0	---	--	--
2 years at 38°C (6 cans)										
Mean	7.0	24	Good	Yes	128.0	Good	128.0	37.0	78	22
Standard Deviation	3.0		----	---	3.0	----	3.0	2.2	--	--
Nonconformances	2 out of 6		----	---	3 out of 6	----	0	---	--	--

* = not less than

Table 4b
Beefsteak with Gravy, Canned
MIL-B-001072F

1974 Procurement — Oscar Mayer & Co.
$5\frac{1}{2}$-oz cans — Code: 1A-13113

Summary of Physical Examinations on 30 Cans over a Two-Year-Storage Period at 4°, 21°, and 38°C
Attributes* not expected to be Affected by Time and Temperature of Storage

	Range	Mean	Standard Deviation	Specification Requirement	Nonconformances
Net weight (g)	156-170	164	4.0	** ≮ 149	0
No. of beef slices per can meeting specification requirements	4	4	0	≮ 4	0
Thinnest & thickest point of beef slices (in.)	1/4 - 1/2	3/8	---	≮ 1/4 - 3/8	14 cans of 30 ham slices > 3/8"
No. of pieces of bone > 1/4"	0	0	0	none	0
Wt. of pieces of opaque connecting tissue, ligaments, tendons, blood vessels, cartilage, gristle, etc., (g)	0 - 12	2	2.6	*** ≯ 14	0
Foreign material	0	0	0	none	0

*All attributes expressed in number or weight per can
** ≮ = not less than
*** ≯ = not more than

Table 4c
Beefsteak with Gravy, Canned
MIL-B-001072F
1974 Procurement — Oscar Mayer & Co.
5½-oz cans — Code: 1A-13113
Chemical and Nutritional Analyses

	Sample #1	Sample #2	Sample #3	Mean	Standard Deviation	Specification Requirement MIL-B-001072F	Nonconformances
Moisture (%)	67.26	66.77	66.77	66.93	0.3	---	---
Protein (%)	24.31	24.47	24.50	24.43	0.1	---	---
Fat (%)	5.79	5.42	5.48	5.56	0.2	*≯15	0
Ash (%)	1.67	1.69	1.70	1.69	0.02	---	---
Salt (%)	1.17	1.15	1.14	1.15	0.2	0.8 - 1.5	0
Ca (mg/100 g)	21.8	21.3	23.8	22.3	1.3	---	---
P (mg/100 g)	155	157	163	158	4.2	---	---
Fe (mg/100 g)	3.6	3.6	3.5	3.6	0.06	---	---
Na (mg/100 g)	458	466	457	460	4.9	---	---
Mg (mg/100 g)	18.7	18.2	19.0	18.6	0.4	---	---

* ≯ = not greater than

Table 4d
Beefsteak with Gravy, Canned
MIL-B-3872D
1974 Procurement Oscar Mayer & Co.
Mean Sensory Panel Ratings over a 24-month Storage Period at 4°C, 21°C, and 38°C for Attributes of Appearance, Odor, Flavor, Texture, and Overall Quality(1)

	N	Appearance			Odor			Flavor			Texture			Overall Quality		
		4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C
0 mo	19	6.0(2)	6.0	6.0	6.4	6.4^{ab}	6.4^{a}	5.9	5.9	5.9	6.3	6.3	6.3	6.0	6.0	6.0
6 mo	17	6.2	6.1	6.0	6.4	6.4^{ab}	6.4^{ab}	6.1	6.1	5.8	6.4	6.4	6.2	6.2	6.1	5.9
12 mo	17	6.2	6.2	6.2	6.5	6.6^{a}	6.4^{ab}	6.2	6.3	5.6	6.3	6.3	6.1	6.2	6.2	5.8
18 mo	18	5.9	6.0	5.9	6.1	6.1^{ab}	5.8^{ab}	6.2	6.4	5.6	6.1	6.1	5.8	6.2	6.3	5.6
24 mo	21	5.8	5.8	5.9	6.0	6.0^{b}	5.7^{b}	5.8	5.8	5.0	6.0	6.1	5.8	5.7	5.8	5.2
F test		NS	NS	NS	NS	NS	SIG	SIG	NS	NS	NS	NS	NS	NS	NS	NS

(1) All samples were evaluated at room temperature and rated on a scale from 1 to 9 in which 1 = extremely poor, 9 = excellent

(2) Mean ratings without a letter indicates no significant difference. Changes in letters (for example, from a to b) indicates a significant difference at the 5% level

Table 5a
Beef with Spiced Sauce, Canned
MIL-B-3872D

1974 Procurement — Tony Downs Foods Co.
5½-oz cans — Code: 5-10A3

Summary of Physical Examinations for Attributes that may be Influenced by Time and Temperature of Storage

	Can Vacuum (in Hg)	Can Vacuum (KPa)	Can condition	Presence of sauce	Meat on Top Sieve (¼")(g)	Meat on Bottom Sieve (No. 8) (g)	Total Meat Weight (g)	Sauce Weight (by difference) (g)	# of meat pieces > 3/4" x 3/4" x 1/2"	# of meat pieces < 1/4" x 1/4" x 3/8"	Color of Product	% Beef	% Sauce (by difference)
Specification requirements MIL-B-3872D	* 5.0	17		Must be present	85.0		106.0	---	none	none	Not foreign	--	--
Initial (3 cans)													
Mean	5.0	17	1 can dented	Yes	97.0	5.0	102.0	63.3	4.7	5 grams**	Good	62	38
Standard Deviation	0.3			---	5.2	0.0	5.2	2.9	1.2	---	----	--	--
Nonconformances	---			---	0	---	2 out of 3	---	3 out of 3	---	----	--	--
1 year at 4°C (3 cans)													
Mean	3.0	10	Good	No	111.0	14.3	125.3	36.7	3.6	---	Good	77	23
Standard Deviation	0.8		----	--	3.5	5.5	2.1	6.4	0.6	---	----	--	--
Nonconformances	3 out of 3		----	3 out of 3	0	---	0	---	3 out of 3	---	----	--	--
1 year at 21°C (3 cans)													
Mean	3.0	10	Good	No	118.0	17.3	135.3	30.0	2.3	---	Good	82	18
Standard Deviation	1.0		----	--	5.6	6.0	10.2	12.5	0.6	---	----	--	--
Nonconformances	3 out of 3		----	3 out of 3	0	---	0	---	3 out of 3	---	----	--	--
1 year at 38°C (3 cans)													
Mean	5.0	17	Good	Yes	99.7	14.3	114.0	51.0	1.3	---	Good	69	31
Standard Deviation	0.3		----	---	6.1	0.6	5.6	3.6	1.5	---	----	--	--
Nonconformances	1 out of 3		----	---	0	---	0	---	2 out of 3	---	----	--	--
2 years at 4°C (6 cans)													
Mean	3.0	10	Good	No	115.1	5.2	120.3	46.0	2.5	28%**	Good	73	27
Standard Deviation	0.8		----	--	3.7	1.7	3.4	4.7	1.4	1.5	----	--	--
Nonconformances	5 out of 6		6 out of 6	--	0	---	0	---	6 out of 6	6 out of 6	----	--	--
2 years at 21°C (6 cans)													
Mean	2.0	7	Good	No	98.7	15.2	118.8	46.7	2.3	45%	Good	72	28
Standard Deviation	0.8		----	--	6.9	4.6	3.1	3.8	1.0	21.9	----	--	--
Nonconformances	6 out of 6		----	6 out of 6	0	0	0	---	6 out of 6	6 out of 6	----	--	--
2 years at 38°C (6 cans)													
Mean	0	0	sl. rust on	Slight	89.2	15.2	109.8	56.0	2.3	60%	Good	66	34
Standard Deviation	---	--	seams	--	5.8	3.9	5.0	4.7	1.6	11.7	----	--	--
Nonconformances	6 out of 6		----	--	1 out of 6	---	1 out of 6	---	5 out of 6	6 out of 6	----	--	--

* = not less than
**Amount too large or to difficult to count

Table 5b
Beef with Spiced Sauce, Canned
MIL-B-3872D
1974 Procurement — Tony Downs Food Co.
5½-oz cans — Code: 5-10A3
Summary of Physical Examinations on 30 Cans over a 2-Year Storage Period at 4°, 21°, and 38°C
Attributes* not expected to be influenced by Time and Temperature of Storage

	Range	Mean	Standard Deviation	Specification Requirement MIL-B-3872D	Nonconformances
Net weight (g)	158-169	164.0	2.5	156	0
Wt. of fat chunks, connecting tissue, ligaments, tendons, blood vessels, cartilage, gristle, and grandular tissue > 1/4" (g)	0-19	8.4	5.5	**≯14	5 out of 30 cans
No. of hard materials	0	0	0	0	0
Wt. of bone > 1/4" (g)	0-2	0	0.4	0	1 out of 30 cans
Foreign material	0	0	0	none	0

*All attributes expressed in numbers or weight per can
**≯ = not greater than

Table 5c
Beef with Spiced Sauce, Canned
MIL-B-3872D
1974 Procurement — Tony Downs Foods Co.
5½-oz cans — Code: 5-10A3
Chemical and Nutritional Analyses

	Sample #1	Sample #2	Sample #3	Mean	Standard Deviation	Specification Requirement MIL-B-3827D	Nonconformances
Moisture (%)	65.84	67.15	65.35	66.11	0.9	---	---
Protein (%)	19.69	18.01	17.39	18.4	1.2	---	---
Fat (%)	11.69	10.26	13.47	11.9	1.6	*≯15	0
Ash (%)	1.59	1.78	1.68	1.68	1.0	---	---
Salt (%)	1.01	1.00	1.04	1.02	0.02	0.8-1.5	0
Ca (mg/100 g)	62.5	53.3	58.2	58.0	4.6	---	---
P (mg/100 g)	124	120	124	123	2.3	---	---
Fe (mg/100 g)	2.3	2.2	2.2	2.2	0.06	---	---
Na (mg/100 g)	416	486	501	468	45.4	---	---
K (mg/100 g)	287	300	308	298	10.6	---	---
Mg (mg/100 g)	26.0	23.7	24.6	24.8	1.2	---	---

* ≯ = not greater than

Table 5d
Beef with Spiced Sauce, Canned
MIL-B-3872D
1974 Procurement Tony Downs Foods Co.
Mean Sensory Panel Ratings over a 24-month Storage Period at 4°, 21°, and 38°C
for Attributes of Appearance, Odor, Flavor, Texture, and Overall Quality(1)

		Appearance			Odor			Flavor			Texture			Overall Quality		
	N	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C
0 mo	20	5.4(2)	5.4	5.4	6.2	6.2	6.2	5.6	5.6	5.6	6.0	6.0	6.0	5.6	5.6	5.6
6 mo	18	5.5	5.6	6.1	6.1	6.1	6.3	6.0	5.8	5.5	5.8	5.7	6.0	5.8	5.7	5.5
12 mo	20	5.4	5.3	5.6	6.0	6.1	6.0	5.6	5.7	5.6	5.8	5.9	5.6	5.7	5.8	5.6
18 mo	20	5.6	5.5	5.2	6.0	6.0	5.7	6.0	5.7	5.1	5.7	5.5	5.4	5.9	5.5	5.1
24 mo	21	5.4	5.4	5.4	6.2	6.1	5.7	5.8	5.9	4.8	5.9	5.7	5.3	5.9	5.8	4.8
F test		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

(1) All samples were evaluated at room temperature and rated on a scale from 1 to 9 in which 1 = extremely poor, 9 = excellent

(2) Mean ratings without a letter indicates no significant difference. Changes in letters (for example, from a to b) indicates a significant difference at the 5% level

Table 6a
Ham and Eggs, Canned, Chopped
MIL-B-1038E

1974 Procurement — Rocking K Foods, Inc.
5½-oz cans — Code: #20-93, HE 4-4

Summary of Physical Examinations for Attributes that may be Influenced by Time and Temperature of Storage

	Can Vacuum (in Hg)	(KPa)	Can Condition	Drained Juice Weight (g)	Product Color
Specification Requirement MIL-H-1038E	*≮ 5.0	≮ 17		0	Not foreign
Initial (3 cans)					
Mean	6.0	20	Good	0	Yellow-brown
Standard Deviation	0		----	0	
Nonconformances	0		----	0	
1 year at 4°C (3 cans)					
Mean	8.0	27	Good	0	Lt. yellow-brown
Standard Deviation	2.1		----	0	
Nonconformances	0		----	0	
1 year at 21°C (3 cans)					
Mean	7.0	24	Good	0	Yellow-brown
Standard Deviation	3.1		----	0	
Nonconformances	1 out of 3		----		
1 year at 38°C (3 cans)					
Mean	9.0	30	Good	0	Yellow-brown
Standard Deviation	1.2		----	0	
Nonconformances	0		----	0	
2 years at 4°C (6 cans)					
Mean	9.0	30	Good	0	Yellow-brown
Standard Deviation	1.9		----	0	
Nonconformances	0		----	0	
2 years at 21°C (6 cans)					
Mean	6.0	20	Good	0	Brownish-yellow
Standard Deviation	0.8		----	0	
Nonconformances	0		----	0	
2 years at 38°C (6 cans)					
Mean	7.0	24	Good	0	Orangey-brownish-yellow
Standard Deviation	2.8		----	0	
Nonconformances	1 out of 6		----		

* ≮ = not less than

Table 6b
Ham and Eggs, Canned, Chopped
MIL-H-1038E

1974 Procurement — Rocking K Foods, Inc.
5½-oz cans — Code #20-93, HE 4-4

Summary of Physical Examinations on 30 Cans over a 2-Year Storage Period at 4°, 21°, and 38°C.
Attributes* not expected to be influenced by Time and Temperature of Storage

	Range	Mean	Standard Deviation	Specification Requirement MIL-H-1038E	Nonconformances
Net weight (g)	149-161	157	2.9	** ≮ 142	0
No. of bone pieces > 1/4"	0	0	0	0	0
Complete Mixing of Ham & Eggs	All good	---	---	Must be thoroughly mixed	0
No. of egg shells	0	0	0	0	0
No. of hard materials > 1/4"	0	0	0	0	0
Foreign material	0	0	0	None	0

* All attributes expressed in numbers or weight per can
** ≮ = not less than

Table 6c
Ham and Eggs, Canned, Chopped
MIL-H-1038E
1974 Procurement Rocking K Food, Inc.
Chemical and Nutritional Analyses

	Sample #1	Sample #2	Sample #3	Mean	Standard Deviation	Specification Requirement MIL-H-1038E	Nonconformances
Moisture (%)	67.98	68.69	67.91	68.17	0.4	* ≯71	0
Protein (%)	12.78	12.88	12.67	12.78	0.1	--	---
Fat (%)	16.19	15.03	16.30	15.84	0.7	≯15	3 out of 3
Ash (%)	2.23	2.25	2.19	2.22	0.03	--	---
Salt (%)	1.59	1.60	1.54	1.58	0.03	≯2	0
Ca (mg/100 g)	50.2	49.0	51.5	50.2	1.3	--	---
P (mg/100 g)	222	223	216	220	3.8	--	---
Fe (mg/100 g)	1.9	1.8	1.7	1.8	0.1	--	---
Na (mg/100 g)	695	690	671	685	12.7	--	---
K (mg/100 g)	197	196	190	194	3.8	--	---
Mg (mg/100 g)	11.6	9.8	10.7	10.7	0.9	--	---

* ≯ = not greater than

Table 6d
Ham and Eggs, Canned, Chopped
MIL-H-1038E

1974 Procurement — Rocking K Foods, Inc.

Mean Sensory Panel Ratings over a 24-month Storage Period at 4°, 21°, and 38°C for Attributes of Appearance, Odor, Flavor, Texture, and Overall Quality(1)

	N	Appearance			Odor			Flavor			Texture			Overall Quality		
		4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C
0 mo	20	5.4(2)	5.4	5.4[a]	6.0	6.0	6.0[a]	6.1	6.1	6.1[a]	6.3	6.3	6.3	6.0	6.0	6.0[a]
6 mo	18	5.4	5.4	5.1[a]	5.6	5.4	5.1[ab]	5.9	5.7	5.3[a]	6.2	6.1	6.2	5.9	5.7	5.3[a]
12 mo	19	5.6	5.4	5.4[a]	5.7	5.6	5.7[ab]	6.1	5.8	0.2[a]	6.2	6.3	6.3	6.0	5.8	5.4[a]
18 mo	22	5.5	5.4	4.6[ab]	5.7	5.8	5.0[ab]	6.0	5.4	4.0[b]	6.4	6.2	5.8	5.7	5.4	4.2[b]
24 mo	17	5.2	5.2	4.1[b]	5.3	5.3	4.6[b]	5.3	5.3	3.8[b]	6.0	6.1	5.6	5.4	5.2	3.8[b]
F test		NS	NS	SIG	NS	NS	SIG	NS	NS	SIG	NS	NS	NS	NS	NS	SIG

(1) All samples were evaluated at room temperature and rated on a scale from 1 to 9 in which 1 = extremely poor, 9 = excellent

(2) Mean ratings without a letter indicated no significant difference. Changes in letters (for example, from a to b) indicates a significant difference at the 5% level

Table 7a
Ham, Canned, Sliced, Cooked with Juices
MIL-H-1071D

1974 Procurement — Oscar Mayer & Co.
5½-oz cans — Code: #29113, 11

Summary of Physical Examinations for Attributes that may be Influenced by Time and Temperature of Storage

	Vacuum (in Hg)	Vacuum (KPa)	Can Condition	Ham Color	# of Ham slices **> 1 1/2" square	Wt. of meat < 1/2" (g)	Juice Weight (g)	Drained Weight (g)	Wt. of Ham on both sieves (US 0.530 and US #1 (g)	% Ham	% Juices (by difference)
Specification Requirements MIL-H-1071D	*< 5.0	17		Not foreign	4	0	---	< 120.0	< 120.0	---	---
Initial (3 cans)											
Mean	6.0	20	Good	Brownish-pink	4	0	58.0	121.0	121.0	68	32
Standard Deviation	0.5		----	---	0	0	2.6	2.1	2.1	--	--
Nonconformances	0		----	---	0	0	---	1 out of 3	1 out of 3	--	--
1 year at 4°C (3 cans)											
Mean	5.0	17	Good	Pink	4	0	49.0	130.0	130.0	73	27
Standard Deviation	0.5		----	---	0	0	0.6	2.1	2.1	--	--
Nonconformances	1 out of 3		----	---	0	0	---	0	0	--	--
1 year at 21°C (3 cans)											
Mean	5.0	17	Good	Pink	4	0	52.0	130.0	130.0	71	29
Standard Deviation	2.4		----	---	0	0	4.0	5.6	5.6	--	--
Nonconformances	2 out of 3		----	---	0	0	---	0	0	--	--
1 year at 38°C (3 cans)											
Mean	4.0	14	Good	Pink	4	0	49.0	133.0	133.0	73	27
Standard Deviation	0.8		----	---	0	0	2.5	3.1	3.1	--	--
Nonconformances	2 out of 3		----	---	0	0	---	0	0	--	--
2 years at 4°C (6 cans)											
Mean	5.0	17	Good	Pink	4	0	47.0	134.0	134.0	74	26
Standard Deviation	2.3		----	---	0	0	4.1	4.5	4.5	--	--
Nonconformances	4 out of 6		----	---	0	0	---	0	0	--	--
2 years at 21°C (6 cans)											
Mean	5.0	17	Good	Pink	4	0	42.0	136.0	136.0	76	24
Standard Deviation	1.8		----	---	0	0	3.6	2.0	2.0	--	--
Nonconformances	3 out of 6		----	---	0	0	---	0	0	--	--
2 years at 38°C (6 cans)											
Mean	4.0	14	Good	Pink	4	0	50.0	131.0	131.0	72	28
Standard Deviation	0.8		----	---	0	0	2.3	4.0	4.0	--	--
Nonconformances	5 out of 6		----	---	0	0	---	0	1 out of 3	--	--

* < = Not less than

Table 7b
Ham, Canned, Sliced, Cooked with Juices
MIL-H-1071D
1974 Procurement — Oscar Mayer & Co.
5½-oz cans — Code: #29113, 11
Summary of Physical Examinations on 30 Cans over a Two-Year Storage Period at 4°, 21°, and 38°C.
Attributes* not expected to be influenced by Time and Temperature of Storage

	Range	Mean	Standard Deviation	Specification Requirement MIL-H-1071D	Nonconformances
Net weight (g)	170-185	180.00	2.90	** ≮ 149	0
Thinnest and thickest point of can slice (in.)	1/4-7/16		---	1/8-3/4	0
Wt. of connecting tissue, ligaments, tendons, blood vessels, cartilage, gristle and glandular tissue > 1/4" (g)	0-.5	0.02	0.09	*** ≯ 3.5	0
No. of bone pieces > 1/4"	0	0	0	0	0
Foreign material	0	0	0	None	0

*All attributes expressed in numbers or weight per can
** ≮ = not less than
*** ≯ = not greater than

Table 7c
Ham, Canned, Sliced, Cooked with Juices
1974 Procurement MIL-H-1071D Oscar Mayer & Co.
5½-oz cans Code: #29113, 11
Chemical and Nutritional Analyses

	Sample #1	Sample #2	Sample #3	Mean	Standard Deviation	Specification Requirement MIL-H-1071D	Nonconformances
Moisture (%)	70.94	70.22	69.88	70.34	0.5	---	---
Protein (%)	15.05	15.35	14.70	15.03	0.3	---	---
Fat (%)	10.44	10.81	12.06	11.10	0.8	*≯15	0
Ash (%)	3.18	3.33	3.00	3.17	0.2	---	---
Salt (%)	2.75	2.44	2.44	2.54	0.2	2.0 - 3.0	0
Ca (mg/100 g)	21.1	20.6	23.6	21.8	1.6	---	---
P (mg/100 g)	222	227	216	222	5.5	---	---
Fe (mg/100 g)	0.9	0.8	0.7	0.8	0.1	---	---
Na (mg/100 g)	1061	1101	973	1045	65.5	---	---
K (mg/100 g)	243	227	229	233	8.7	---	---
Mg (mg/100 g)	15.4	13.7	14.8	14.6	0.9	---	---

*≯ = Not greater than

Table 7d
Ham, Canned, Sliced Cooked with Juices
1974 Procurement — Oscar Mayer & Co.

Mean Sensory Panel Ratings over a 24-month Storage Period at 4°, 21°, and 38°C for Attributes of Appearance, Odor, Flavor, Texture, and Overall Quality(1)

	N	Appearance			Odor			Flavor			Texture			Overall Quality		
		4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C
0 mo	19	6.2(2)	6.2	6.2	6.4	6.4	6.4	6.2	6.2	6.2	5.7	5.7	5.7	6.1	6.1	6.1
6 mo	19	5.6	5.9	6.1	6.2	6.3	6.2	5.9	6.1	5.7	5.6	5.8	5.7	5.6	5.9	5.6
12 mo	19	5.6	5.6	5.8	6.2	6.1	5.7	5.8	5.6	5.5	5.5	5.5	5.5	5.6	5.6	5.6
18 mo	18	5.6	5.7	5.7	6.1	6.1	5.9	6.0	5.8	5.4	5.9	5.9	5.8	5.7	5.7	5.6
24 mo	25	5.7	5.7	5.7	6.2	6.0	5.7	6.1	5.9	5.4	6.0	5.9	5.7	6.0	5.8	5.4
F test		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

(1) All samples were evaluated at room temperature and rated on a scale from 1 to 9 in which 1 = extremely poor, 9 = excellent

(2) Mean ratings without a letter indicated no significant difference. Changes in letters (for example, from a to b) indicates a significant difference at the 5% level

Table 8a
Pork, Canned, Sliced, Cooked with Juices
MIL-P-1069D

1974 Procurement — Oscar Mayer & Co.
5½-oz cans — Code: #20113.2

Summary of Physical Examinations for Attributes that may be influenced by Time and Temperature of Storage

	Can Vacuum (in Hg)	(KPa)	Can Condition	Weight of Pork on top sieve (0.53")(g)	Total wt. of pork (g)	Wt. of Pork appearing like ground meat (g)	Product Color	% Pork	% Juices by (difference)
Specification Requirements MIL-P-1069D	*≮ 5.0	≮ 17		≮ 113.0	≮ 128.0	None	Not foreign	--	--
Initial (3 cans)									
Mean	5.0	17	Good	127.0	127.0	0	Good	77	23
Standard Deviation	3.1		----	0.6	0.6	0	----	--	--
Nonconformances	1 out of 3		----	0	2 out of 3	½ 0	----	--	--
1 year at 4°C (3 cans)									
Mean	7.0	24	Good	141.0	141.0	0	Good	84	16
Standard Deviation	0.8		----	1.2	1.2	0	----	--	--
Nonconformances	0		----	0	0	0	----	--	--
1 year at 21°C (3 cans)									
Mean	6.0	20	Good	139.0	139.0	0	v.sl.discoloration	80	20
Standard Deviation	0.8		----	8.1	8.1	0	on surfaces of top	--	--
Nonconformances	0		----	0	0	0	sieve	--	--
1 year at 38°C (3 cans)									
Mean	6.0	20	Good	144.0	144.0	0	sl. discoloration	85	15
Standard Deviation	2.0		----	9.3	9.3	0	on top sieve	--	--
Nonconformances	1 out of 3		----	0	0	0	surfaces	--	--
2 years at 4°C (6 cans)									
Mean	7.0	24	Good	144.0	144.0	0	2 gray slices out	85	15
Standard Deviation	1.4		----	4.5	4.5	0	of 18	--	--
Nonconformances	0		----	0	0			--	--
2 years at 21°C (6 cans)									
Mean	4.0	14	Good	141.0	141.0	0	1 slice with	80	20
Standard Deviation	1.0		----	5.4	5.4	0	black spot	--	--
Nonconformances	4 out of 6		----	0	0	0		--	--
2 years at 38°C (6 cans)									
Mean	4.0	14	Good	137.0	137.0	0	sl. gray on	80	20
Standard Deviation	1.3		----	6.2	6.2	0	top surfaces.	--	--
Nonconformances	4 out of 6		----	0	0	0		--	--

*≮ = not less than

Table 8b

Pork, Canned, Sliced, Cooked with Juices

1974 Procurement — Oscar Mayer & Co.

5½-Oz cans — Code: #20113, 2

MIL-P-1069D

Summary of Physical Examinations on 30 cans over a 2-year Storage Period at 4°, 21°, and 38°C.
Attributes* not expected to be influenced by Time and Temperature of Storage

	Range	Mean	Standard Deviation	Specification Requirement MIL-P-1069D	Nonconformances
Net weight (g)	163-179	171	4.5	** ≮ 149	0
Thickness of slices at thinnest and thickest point (in.)	3/8 - 3/16	---	---	1/4 - 3/4	0
No. of bone pieces > 1/4"	0	0	0	0	0
No. of pieces of hard material > 1"	0	0	0	0	0
Foreign material	0	0	0	None	0

*All attributes expressed in numbers or weight per can

** ≮ = not less than

Table 8c
Pork, Canned, Sliced, Cooked, with Juices
MIL-P-1069D

1974 Procurement — Oscar Mayer & Co.
$5\frac{1}{2}$-oz cans — Code: #20113, 2
Chemical and Nutritional Analyses

	Sample #1	Sample #2	Sample #3	Mean	Standard Deviation	Specification Requirement MIL-P-1069D	Nonconformances
Moisture (%)	65.13	65.30	65.48	65.30	0.2	---	---
Protein (%)	17.04	16.92	16.99	16.98	0.06	---	---
Fat (%)	14.40	13.94	14.17	14.17	0.2	* ≯17	0
Ash (%)	3.28	3.30	3.21	3.26	0.04	---	---
Salt (%)	2.88	3.04	3.09	3.00	0.1	1.5 - 3.5	0
Ca (mg/100 g)	18.4	21.2	21.0	20.2	1.6	---	---
P (mg/100 g)	166	166	159	164	4.0	---	---
Fe (mg/100 g)	1.3	1.3	1.3	1.3	----	---	---
Na (mg/100 g)	1034	1043	1031	1036	6.2	---	---
K (mg/100 g)	378	351	348	359	16.5	---	---
Mg (mg/100 g)	27.0	27.0	26.1	26.7	0.5	---	---

* ≯ = not greater than

Table 8d

Pork, Canned, Sliced, Cooked with Juices

1974 Procurement — Oscar Mayer & Co.

MIL-P-1069D

Mean Sensory Panel Ratings over a 24-Month Storage Period at 4°, 21°, and 38°C for Attributes of Appearance, Odor, Flavor, Texture, and Overall Quality(1)

	N	Appearance			Odor			Flavor			Texture			Overall Quality		
		4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C
0 mo	19	5.9(2)	5.9	5.9	6.1	6.1	6.1	5.9	5.9	5.9	6.0	6.0	6.0	5.8	5.8	5.8
6 mo	19	5.7	5.7	5.9	6.1	6.1	6.2	5.6	5.7	5.6	6.0	6.2	6.1	5.6	5.7	5.6
12 mo	18	6.1	5.8	5.9	6.0	5.8	5.8	5.5	5.6	5.5	5.8	5.7	5.7	5.6	5.6	5.4
18 mo	21	5.8	5.9	6.1	6.0	6.1	6.0	5.5	5.9	5.3	5.7	5.7	5.5	5.6	5.6	5.5
24 mo	24	5.8	5.9	5.8	6.1	6.2	6.0	5.5	5.9	5.3	5.7	5.8	5.5	5.6	5.9	5.4
F test		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

(1) All samples were evaluated at room temperature and rated on a scale from 1 to 9 in which 1 = extremely poor, 9 = excellent

(2) Mean ratings without a letter indicated no significant difference. Changes in letters (for example, from a to b) indicates a significant difference at the 5% level

Table 9a

Spaghetti with Beef Chunks in Sauce, Canned
MIL-S-001078F

1974 Procurement — Blue Star Foods, Inc.
12-oz cans — Code: #27123

Summary of Physical Examinations that may be Influenced by Time and Temperature of Storage

	Can Vacuum (in Hg)	Can Vacuum (KPa)	Can Condition	Consistency	Product Color	Weight of Meat on Top Sieve (0.53") (g)	Weight of Spaghetti on Top Sieve*** (0.53") (g)	Spaghetti Texture
Specification Requirement MIL-S-001078F	≥ 5.0	17		Should slide from can when shaken	Not foreign	≥ 43.0	≥ 85.0	Not matted, mushy or pasty
Initial (6 cans)								
Mean	8.0	27	Good	Solid	Good	51.0	85.0	Matted
Standard Deviation	1.0		----	0	----	16.3	36.7	----
Nonconformances	0		----	6 out of 6	----	1 out of 6	2 out of 6	6 out of 6
1 year at 4°C (3 cans)								
Mean	10.0	34	Good	Solid	Good	42.0	87.0	Mushy, matted, pasty
Standard Deviation	0.6		----	0	----	11.8	8.6	-----
Nonconformances	0		----	6 out of 6	----	2 out of 3	1 out of 3	3 out of 3
1 year at 21°C (3 cans)								
Mean	10.0	34	Good	Solid	Good	44.0	78.0	Mushy, matted, pasty
Standard Deviation	2.5		----	0	----	13.5	6.7	-----
Nonconformances	0		----	6 out of 6	----	1 out of 3	3 out of 3	3 out of 3
1 year at 38°C (3 cans)								
Mean	6.0	20	Good	Solid	Good	61.0	71.0	Mushy, matted, pasty
Standard Deviation	1.5		----	0	----	1.5	9.6	-----
Nonconformances	0		----	6 out of 6	----	0	3 out of 3	3 out of 3
2 years at 4°C (6 cans)								
Mean	6.0	20	sl. rust on seams	Solid	Good	48.0	110.0	Mushy, matted, gummy
Standard Deviation	1.8		2 sl. dented	0	----	16.9	22.5	-----
Nonconformances	1 out of 6		----	6 out of 6	----	3 out of 6	0	6 out of 6
2 years at 21°C (6 cans)								
Mean	8.0	27	sl. rust on seams	Solid	Good	39.0	50.0**	Mushy, matted, gummy
Standard Deviation	2.4		----	0	----	15.0	50.2	-----
Nonconformances	1 out of 6		----	6 out of 6	----	4 out of 6	6 out of 6	6 out of 6
2 years at 38°C (6 cans)							(both sieves)	
Mean	0	0	sl. rust on seams	Solid	Good	39.0	167.0	Mushy, matted, gummy
Standard Deviation	---		----	0	----	12.8	42.8	-----
Nonconformances	6 out of 6		----	6 out of 6	----	4 out of 6	---	6 out of 6

*≥ Not Less Than

**Rinsed thoroughly to remove all sauce

***Procedure unreliable because considerable spaghetti and meat pass through 0.53" sieve

Table 9b
Spaghetti with Beef Chunks in Sauce, Canned
MIL-S-001078F

1974 Procurement — Blue Star Foods, Inc.
12-oz cans — Code: #27123

Summary of Physical Examinations on 33 cans Over a Two-Year Storage Period at 4°, 21°, and 38°C.
Attributes* not expected to be influenced by Time and Temperature of storage

	Range	Mean	Standard Deviation	Specification Requirement MIL-S-001078F	Nonconformances
Net weight (g)	390-359	342.00	5.3	** ≮ 326	0
Weight of beef > 2" (g)	0	0	0	0	0
Weight of fat chunks, connecting tissue, ligaments, tendons, blood vessels, cartilage, gristle, and grandular material > (g)	1-18	6.0	4.1	*** > 14	2 out of 33
No. of hard materials > 1/2"	0	0	0	0	0
No. of bone pieces > 1/4"	0	0	0	0	0
Foreign material	0	0	0	None	0

*All attributes expressed in numbers or weight per can
** ≮ = not less than
*** > = not more than

Table 9c
Spaghetti with Beef Chunks in Sauce, Canned
MIL-S-001078F

1974 Procurement
12-oz cans

Blue Star Foods, Inc.
Code: #27123

Chemical and Nutritional Analyses

	Sample #1	Sample #2	Sample #3	Mean	Standard Deviation	Specification Requirement MIL-S-001078F	Nonconformances
Moisture (%)	71.84	73.91	71.45	72.40	1.3	*74	0
Protein (%)	8.82	7.62	7.83	8.10	0.64	--	---
Fat (%)	9.63	6.91	9.84	8.79	1.6	8	2 out of 3
Ash (%)	1.71	2.00	1.68	1.80	0.18	--	---
Salt (%)	1.43	1.64	1.25	1.44	0.2	--	---
Ca (mg/100 g)	54.3	64.0	54.9	57.7	5.4	--	---
P (mg/100 g)	77	84	75	78.7	4.7	--	---
Fe (mg/100 g)	1.3	1.2	1.2	1.2	0.06	--	---
Na (mg/100 g)	512	603	505	540	54.7	--	---
K (mg/100 g)	151	144	137	141	12.3	--	---
Mg (mg/100 g)	11.6	12.3	12.2	12.0	0.38	--	---

*- not greater than

Table 9d
Spaghetti with Beef Chunks, in Tomato Sauce, Canned
MIL-S-001078F
1974 Procurement Blue Star Foods Inc.

Mean Sensory Panel Ratings over a 24-Month Storage Period at 4°, 21°C, and 38°C for Attributes of Appearance, Odor, Flavor, Texture, and Overall Quality(1)

	N	Appearance			Odor			Flavor			Texture			Overall Quality		
		4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C	4°C	21°C	38°C
0 mo	19	6.6(2)	6.6	6.6[a]	6.8	6.8	6.8[a]	6.3	6.3	6.3[a]	6.5[a]	6.5[a]	6.5[a]	6.4[a]	6.4	6.4[a]
6 mo	19	6.1	6.5	6.5[a]	6.5	6.6	6.6[a]	5.8	6.1	6.3[a]	5.9[b]	6.0[ab]	6.0[a]	5.9[ab]	6.2	6.1[a]
12 mo	18	6.1	6.1	5.8[ab]	6.2	6.3	5.4[b]	5.7	5.9	4.7[b]	5.5[b]	5.7[ab]	5.1[b]	5.4[b]	5.8	4.7[b]
18 mo	20	5.8	6.0	5.6[b]	6.3	6.3	5.8[b]	5.8	5.7	5.0[b]	5.6[b]	5.5[b]	5.1[b]	5.7[ab]	5.7	4.9[b]
24 mo	22	5.9	5.9	5.5[b]	6.4	6.3	5.7[b]	5.8	5.9	4.4[b]	5.6[b]	5.4[b]	4.8[b]	5.7[ab]	5.8	4.5[b]
F test		NS	NS	SIG	NS	NS	SIG	NS	NS	SIG	SIG	SIG	SIG	SIG	NS	SIG

(1) All samples were evaluated at room temperature and rated on a scale from 1 to 9 in which 1 = extremely poor, 9 = excellent

(2) Mean ratings without a letter indicated no significant difference. Changes in letters (for example, from a to b) indicates a significant difference at the 5% level